



# UNITED STATES PATENT AND TRADEMARK OFFICE

0

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,985	08/30/2001	Arup Bhattacharyya	1303.023US1	1905

21186 7590 02/13/2004

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

EXAMINER
----------

TRAN, THIEN F

ART UNIT	PAPER NUMBER
----------	--------------

2811

DATE MAILED: 02/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/944,985

Applicant(s)

BHATTACHARYYA, ARUP

Examiner

Thien F Tran

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-84 and 117-124 is/are pending in the application.
- 4a) Of the above claim(s) See Continuation Sheet is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 14, 18, 19, 56, 57, 59, 63, 73, 74, 76, 80 and 84 is/are rejected.
- 7) ☒ Claim(s) 7, 62 and 79 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

Continuation of Disposition of Claims: Claims withdrawn from consideration are 3,5,6,8-13,15-17,20-55,58,60,61,64-72,75,77,78,81-83 and 117-124.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 14, 56-57, 63, 73-74, 80 and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoji et al. (USPN 5,332,915) in view of Bass, Jr. et al. (USPN 4,870,470).

Shimoji et al. discloses a gate stack (Fig. 1) comprising a tunnel medium 5; a high K charge blocking and charge storing medium 4 disposed on the tunnel medium; and a high dielectric film 2 having a high dielectric constant of at least 10. Shimoji et al. does not specifically disclose the high dielectric film 2 including SRN (silicon rich nitride). Bass, Jr. et al. discloses a gate stack (Fig. 6) having an injector medium 35 of SRN. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the high dielectric film 2 including SRN as an injector medium as taught by Bass, Jr. et al. to provide good charge injecting properties that provide appreciably enhanced charge conductance.

Shimoji et al. further discloses a memory cell (Fig. 1) comprising a substrate 5; N+ doped regions that inherently form source and drain regions on opposite sides of the gate stack; and a gate 1 disposed on the gate stack.

Art Unit: 2811

Regarding claims 73 and 84, Shimoji et al. in view of Bass, Jr. et al. does not explicitly disclose the memory cell being used in an electronic system comprising a processor and a nonvolatile memory device coupled to the processor, the memory device including an array of memory cells coupled to a grid of row lines and column lines; row select circuitry and column select circuitry wherein the row select circuitry and the column select circuitry cooperate to select a memory cell for application of a programming voltage. A processor and a nonvolatile memory device coupled to the processor, the memory device including an array of memory cells coupled to a grid of row lines and column lines; row select circuitry and column select circuitry cooperated to select a memory cell for application of a programming voltage are conventional elements in a conventional electronic system. It would have been obvious to form the memory cell of the modified Shimoji et al. as the memory cells in the conventional electronic system having the conventional elements as described above for the advantages that the modified Shimoji et al. provides.

Claims 4, 18-19, 59, 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoji et al. (USPN 5,332,915) in view of Bass, Jr. et al. (USPN 4,870,470) as applied to claims 1, 56, 73, 84 above, and further in view of Sadd et al. (USPN 6,444,545).

Shimoji et al. in view of Bass, Jr. et al. does not disclose the tunnel medium 5 including tunnel  $\text{Al}_2\text{O}_3$ .  $\text{Al}_2\text{O}_3$  and  $\text{SiO}_2$  are dielectric materials known in the art and routinely used as materials for tunnel medium in semiconductor device as shown for example Sadd et al. (col. 2, lines 27-31). Therefore, it would have been obvious to one

Art Unit: 2811

of ordinary skill in the art at the time the invention was made to select any one of these materials as a suitable dielectric material for the tunnel medium of the modified Shimoji et al. to provide good FN tunneling electroconductivity, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice. In re Leshin, 125 USPQ 416.

Regarding claims 18-19, Shimoji et al. and Bass, Jr. et al. does not specifically disclose the high K charge blocking and charge storing medium 4 including nano crystals for providing charge trapping charge centers. Sadd et al. disclose a gate stack (Fig. 8) comprising a charge blocking and charge storing medium 35 including silicon nano crystals 32. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the high K charge blocking and charge storing medium 4 including nano crystals as taught by Sadd et al. so that much of the charge would remain in the storage medium 4 due to trapping in the nano crystals. As a result, charge leak off from the medium 4 would be reduced.

#### ***Allowable Subject Matter***

Claims 7, 62 and 79 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

Applicant's arguments filed 11/12/2003 have been fully considered but they are not persuasive.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the suggestion is found in Bass, Jr. et al. reference (see col. 8, lines 37-43).

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

### **Conclusion**

Art Unit: 2811

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien F Tran whose telephone number is (703) 308-4108. The examiner can normally be reached on 8:30AM - 5:00PM Monday through Friday.

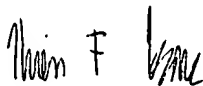
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on (703) 308-1690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2811

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tt  
February 03, 2004

  
Thien F Tran  
Primary Examiner